SUMMARY

S1.1 INTRODUCTION

U.S. Department of Energy (DOE) facilities on the Oak Ridge Reservation (ORR) in the Oak Ridge, Tennessee area, have performed nuclear energy research and radiochemical production since the early 1940s. The reservation encompasses 13,974 contiguous hectares (ha) (34,516 acres), and the Y-12 Plant, the East Tennessee Technology Park (ETTP), and the Oak Ridge National Laboratory (ORNL) are major DOE facilities within it.

ORNL was constructed during World War II as a pilot-scale plant to support nuclear energy research and the construction of larger plutonium production facilities at Hanford, Washington. ORNL is located on approximately 1,174 ha (2,900 acres) (Figure S-1) in a water-rich environment, with numerous small tributaries that flow into the Clinch River located to the south and west. ORNL is in the Tennessee Valley between the Great Smoky Mountains (located approximately 80 km or 50 miles east) and the Cumberland Plateau (about 45 km or 25 miles west).

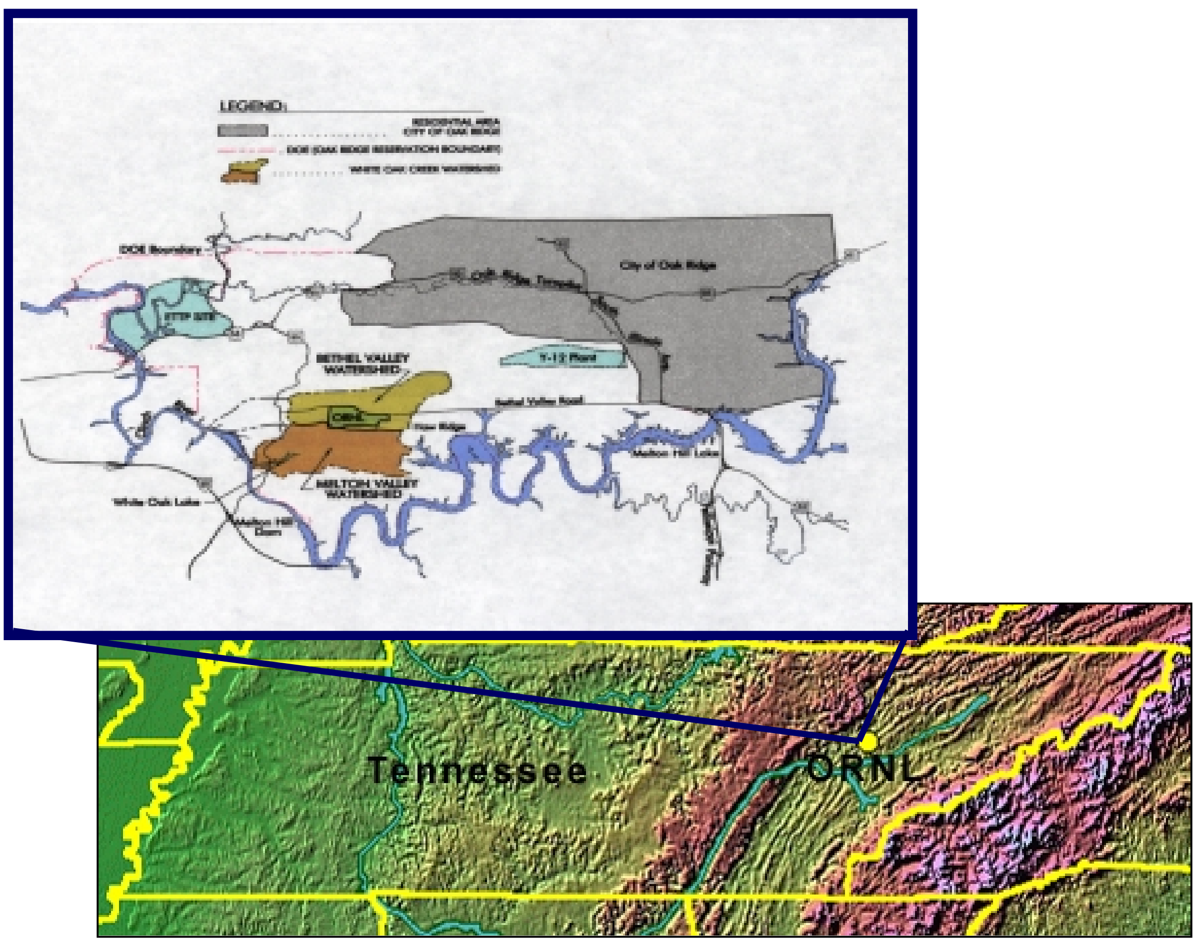

Figure S-1. Location of Oak Ridge National Laboratory in relation to the City of Oak Ridge and other DOE facilities on the Oak Ridge Reservation, and in the State of Tennessee.

ORNL continues to be used for DOE operations and is internationally known as a premier research facility. Research and development activities support national defense and energy initiatives. Ongoing waste management and environmental management activities continue to address legacy[1] and newly generated low-level radioactive[2], transuranic (TRU)[3], and hazardous wastes resulting from research and development activities. Meeting the cleanup challenges associated with legacy and newly generated wastes at ORNL is a high priority for the DOE Oak Ridge Operations (ORO), the Tennessee Department of Environment and Conservation (TDEC), and stakeholders. The treatment and disposal of legacy TRU waste at ORNL is an important component of the DOE cleanup at the site. Currently, no facilities exist at ORNL, or the ORR, for treating TRU mixed[4] waste sludges and associated low-level waste supernate, and contact-handled[5] and remote-handled[6] TRU/alpha low-level[7] waste solids, before disposal.

S1.2 BACKGROUND

During early research activities, little was known about the effects of exposure to radiation and other hazardous substances. Wastes generated from research and development activities, and isotope production, were managed using the best available practices at the time. Liquid radioactive waste was stored in underground storage tanks. Contaminated solid waste was buried in pits and trenches. Although waste management practices have changed as the hazards became better understood, legacy waste remains in storage at ORNL as described below.

S1.2.1 Waste Types

The four legacy waste types that would be treated under the proposed action are:

- remote-handled TRU mixed waste sludge,
- low-level radioactive waste supernate (liquid portion) associated with the TRU sludge waste,
- contact-handled TRU/alpha low-level waste solids, and
- remote-handled TRU/alpha low-level waste solids.

[1]Legacy waste is defined as waste generated from past isotope production and research and development activities.

[2]Low-level waste is defined as any radioactive waste not classified as high-level, spent nuclear fuel TRU, byproduct material, or mixed waste [based on Implementation Guide for Use with DOE M 435.1-1, DOE G 435.1-1, July 1999 (DOE 1999)].

[3]TRU waste is waste not classified as high-level radioactive waste but as waste which contains more than 100 nanocuries per gram (nCi/g) of alpha-emitting TRU isotopes (atomic numbers greater than 92) with half-lives greater than 20 years (based on DOE 1999).

[4]Mixed waste is a waste that contains radioactive waste regulated under the Atomic Energy Act of 1954 as amended, and a hazardous component subject to the Resource Conservation and Recovery Act (based on DOE 1999).

[5]Contact-handled TRU waste contains beta- and gamma-emitting isotopes in addition to alpha-emitting isotopes, with a surface dose rate of 200 millirem per hour (mrem/h) or less [*Internal Dose Conversion Factors for Calculation of Dose to the Public*, DOE/EH-0071, July 1998 (DOE 1998a)].

[6]Remote-handled TRU waste contains beta- and gamma-emitting isotopes in addition to alpha-emitting isotopes, with a surface dose rate greater than 200 mrem/h (DOE 1998a).

[7]Alpha low-level radioactive waste is low-level waste that contains alpha-emitting isotopes.

ORNL currently has the largest inventory of remote-handled TRU waste in the DOE complex, and a smaller portion of the contact-handled TRU waste. The remote-handled TRU waste sludges are solids that precipitated out of the liquid waste during waste storage and settled to the bottom of the underground storage tanks. The contact-handled and remote-handled TRU/alpha low-level waste solids at ORNL are a heterogeneous mixture of paper, glass, rubber, cloth, plastic, and metal from glove boxes, fuel processing facilities, hot cells, and reactors. Based on generator records, the stored solid wastes have been classified as either TRU or alpha low-level radioactive waste. Because the nature of the solid waste can only be confirmed after retrieval and characterization, these solid wastes were characterized as "TRU/alpha low-level radioactive waste" in the Notice of Intent for this draft EIS [*Federal Register* (*FR*) Vol. 64, No. 17, January 27, 1999] to note the current uncertainty.

The remote-handled TRU waste sludge and potentially some of the contact-handled and remote-handled TRU/alpha low-level waste solids contain metals regulated under the Resource Conservation and Recovery Act (RCRA) and, therefore, may be classified as mixed waste due to toxicity. Generator records for the solid wastes do not indicate the presence of any RCRA regulated materials in the solid waste containers; however, if found, solid mixed waste would be segregated from solid non-mixed waste.

Supernate (the liquid portion of the waste stored in the underground storage tanks at ORNL) is generally characterized as low-level waste.

S1.2.2 Waste Storage at ORNL

Approximately 30% of the legacy tank waste is currently stored in aging, underground storage tanks in the Bethel Valley portion of ORNL. These inactive tanks are currently undergoing waste retrieval operations. The retrieved sludge and supernate wastes are being transferred to the Melton Valley Storage Tanks (Figure S-2). See additional discussion in Section S1.3 below. The remainder of ORNL's TRU mixed waste sludge is already stored in the Melton Valley Storage Tanks. Sampling and analyses have been performed on all of the tank waste at ORNL. The radiological and chemical properties of the sludge and supernate have been measured, and a bounding analysis was performed on each constituent to provide a range of waste characteristics. The legacy contact-handled and remote-handled TRU/alpha low-level solid wastes at ORNL are currently stored in subsurface trenches, bunkers, and metal buildings.

Figure S-2. Aerial view of the Melton Valley Storage Tanks–Capacity Increase Project during installation of the six 100,000-gallon tanks, which are located south of the eight 50,000-gallon Melton Valley Storage Tanks.

S1.2.3 PUBLIC SCOPING AND PARTICIPATION

A Notice of Intent to prepare an EIS for the TRU Waste Treatment Project was published in the *Federal Register* (*FR*) on January 27, 1999 (in Appendix A.1). The Notice of Intent identified the public scoping period to encourage early public involvement in the EIS process and to solicit public comments on the proposed scope of the EIS, including the issues and alternatives it would analyze. Two meetings were held in Oak Ridge, Tennessee, on February 11 and 16, 1999, to provide an opportunity for people to comment or make a presentation. Oral and written comments are summarized in Appendix A.3. Most of the comments requested clarification of the proposed action and the alternatives. There was some concern that the High Flux Isotope Reactor access road and the construction of the proposed TRU Waste Treatment Facility would have an impact on the Old Hydrofracture Facility wells. However, these wells are located away from the road and proposed facility and would not be disturbed during any construction activities. The scoping period ended on February 26, 1999.

S1.3 PURPOSE AND NEED FOR AGENCY ACTION

DOE needs to treat the legacy TRU and alpha low-level waste at ORNL in order to reduce the risk to human health and the environment and to comply with legal mandates from the TDEC and the ORNL Site Treatment Plan. In addition, newly generated TRU waste needs to be treated and is included in the waste volumes described below.

The approximate quantities of the waste streams requiring treatment and analyzed in this EIS are:

- 900 m^3 (31,784 ft^3) of remote-handled TRU sludge (mixed waste), which is, or will be, located in the Melton Valley Storage Tanks;
- 1,600 m^3 (56,505 ft^3) of low-level supernate associated with the TRU mixed waste sludge, which is, or will be, located in the Melton Valley Storage Tanks;
- 550 m^3 (19,423 ft^3) of remote-handled TRU waste/alpha low-level radioactive waste solids (may consist of some mixed waste), located in bunkers and subsurface trenches; and
- 1,000 m^3 (35,316 ft^3) of contact-handled TRU waste/alpha low-level radioactive waste solids (may consist of some mixed waste), located in metal buildings.

Waste retrieval operations are currently under way to prepare many of the inactive TRU waste storage tanks in the Bethel Valley area of ORNL for closure. The wastes retrieved from the inactive tanks in Bethel Valley are being consolidated into the Melton Valley Storage Tanks and have been included in the stated waste quantities needing treatment.

Legal mandates require DOE to address legacy TRU waste management. DOE has been directed by the TDEC and the U.S. Environmental Protection Agency (EPA) to address environmental issues including disposal of its legacy TRU waste. DOE is under a TDEC Commissioner's Order (September 1995) to implement the Site Treatment Plan (under the Federal Facility Compliance Act) that mandates specific requirements for the treatment and disposal of ORNL's TRU waste. The primary milestone in the TDEC Commissioner's Order requires that DOE begin treating legacy TRU mixed waste sludge in order to make the first shipment to the Waste Isolation Pilot Plant (WIPP) by the end of January 2003.

Due to the water-rich environment in East Tennessee, legacy TRU/alpha low-level solid wastes contained in the subsurface trenches at ORNL pose a risk to the area's water quality. Removal, treatment, and disposal of the retrievable TRU waste from portions of the Solid Waste Storage Area (SWSA) 5 North is a major component of the proposed remedy for the Melton Valley Watershed at

ORNL according to the Draft Record of Decision for the Melton Valley Watershed at ORNL (DOE 1997a). In addition, an Interim Record of Decision [issued in connection with the Federal Facilities Agreement (FFA) among EPA, TDEC, and DOE under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)] for the Gunite and Associated Tanks Remediation Project (DOE 1997b), and an Action Memorandum for the Old Hydrofracture Facility Tanks Remediation Project (DOE 1997c) requires that the waste contained in these tanks be treated and disposed of along with the TRU waste contained in the Melton Valley Storage Tanks. This tank waste is included in the total waste volume proposed for treatment in the TRU Waste Treatment Project. Currently, no facilities exist at ORNL, or on the ORR, for treating TRU or alpha low-level radioactive waste.

S1.4 PROPOSED ACTION AND ALTERNATIVES

S1.4.1 Proposed Action

DOE proposes to construct, operate, and decommission and decontaminate (D&D) a waste treatment facility (Figure S-3) for the treatment of legacy ORNL TRU, alpha low-level waste, and newly generated TRU waste. All the legacy waste DOE proposes to treat is currently stored at ORNL. The newly generated TRU waste would be treated in the proposed facility until it is closed for D&D.

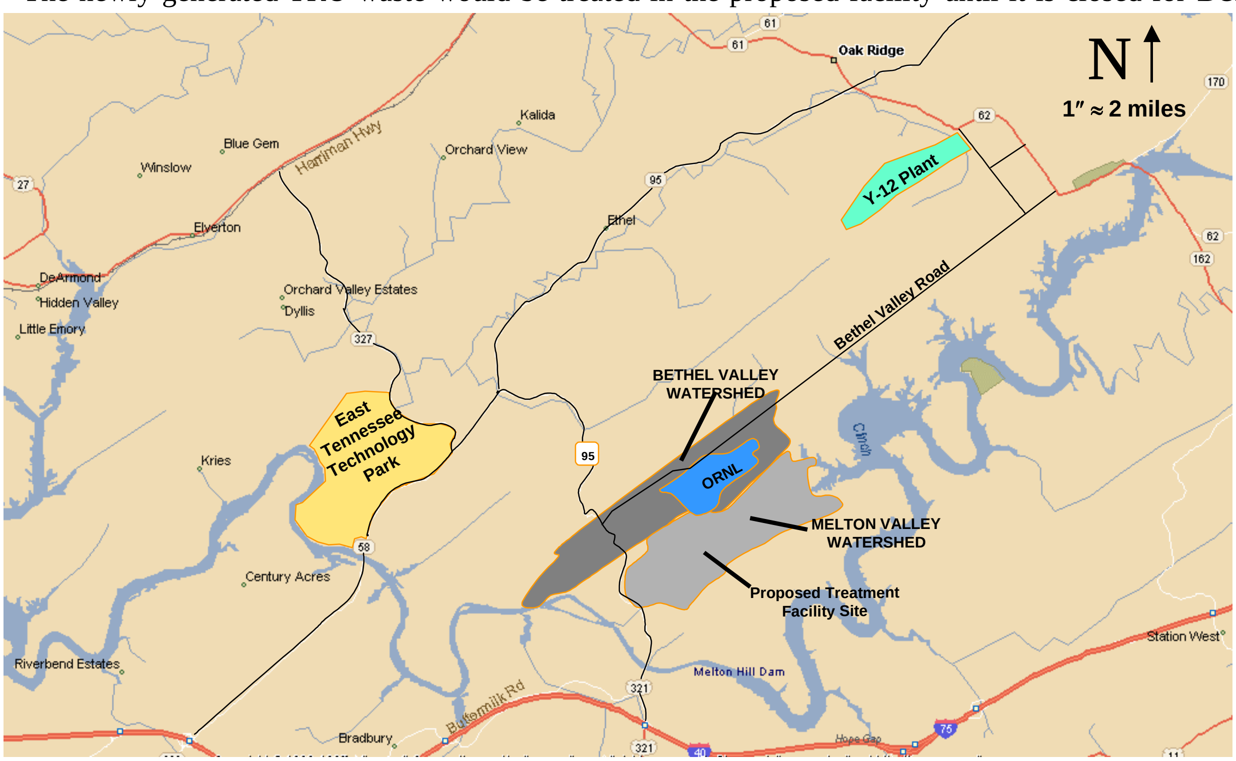

Figure S-3. General site location of the proposed TRU Waste Treatment Project facility on the Oak Ridge Reservation.

TRU waste generated after closure of the proposed facility is not within the scope of the proposed action. Following the waste treatment and packaging operations at the proposed treatment facility, DOE would certify the TRU waste for shipment and disposal at the WIPP, located near Carlsbad, New Mexico [*Record of Decision for the Department of Energy's Waste Isolation Pilot Plant Disposal Phase, FR*, Vol. 63, No. 15, January 1998 (DOE 1998b)]. Low-level waste resulting from the treatment processes would be certified by DOE for disposal at the DOE site(s) to be selected in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE 1997d) Record of Decision for low-level waste that should be issued before the final EIS for the ORNL TRU Waste Treatment project is completed.

DOE prepared a characterization report for the site of the proposed action and sponsored an independent study of treatment technologies and contracting alternatives, known as the Parallax study [ORNL/M-4693, *Feasibility Study for Processing ORNL TRU Waste In Existing and Modified Facilities*, September 15, 1995 (Parallax 1995)]. This facility is needed to reduce the risk to human health and the environment, and to comply with the TDEC Commissioner's Order of 1995, which requires DOE to make the first shipment of treated TRU sludge to the WIPP in New Mexico by January 2003.

This EIS is being prepared according to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality NEPA regulations [40 *Code of Federal Regulations* (*CFR*) 1500–1508], and DOE's NEPA Implementing Procedures (10 *CFR* Part 1021). This draft EIS incorporates pertinent analyses performed as part of the DOE's *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (WIPP SEIS-II) (DOE 1997e), and the WM PEIS (DOE 1997d). Treatment of ORNL TRU waste onsite, and disposal at the WIPP, is consistent with the Record of Decision for the WIPP disposal phase (DOE 1998b) and for DOE's WM PEIS Record of Decision for treatment and storage of TRU waste [*FR* Vol. 63, No. 15, January 23, 1998) (DOE 1998c)] both issued for management of the TRU waste. The disposal of low-level radioactive waste included in the scope of this draft EIS will be consistent with the WM PEIS Record of Decision for low-level waste that has yet to be issued (i.e., disposed of at the Nevada Test Site or another designated disposal facility).

DOE has awarded a contract to the Foster Wheeler Environmental Corporation (Foster Wheeler) for the construction, operation, and D&D of a treatment facility for the TRU and alpha low-level wastes, contingent upon the completion of the NEPA review (if it includes a Record of Decision selecting the contractor's proposed treatment process). The contract would be carried out in four phases including:

- Phase I, Permitting (includes DOE's NEPA analysis and contractor preliminary design activities);
- Phase II, Construction and Pre-Operational Testing;
- Phase III, Waste Treatment, Packaging, and Certification; and
- Phase IV, Decontamination and Decommissioning.

Phase I is a 2.5-year period during which the permitting and preliminary design process is completed for the proposed facility. DOE will complete the NEPA process concurrent with Phase I of the contract. If the current NEPA review results in the selection of a treatment process other than the selected contractor's proposal, Phase II of the contract would not be implemented. The contract also allows DOE to identify, during Phase I, other potential waste streams for treatment at this facility (e.g., small amounts of legacy TRU waste from other sites). An example of such waste is discussed under cumulative impacts. As part of any consideration to send additional waste to ORNL, further NEPA review, as appropriate, would be conducted.

The phased procurement approach described above is consistent with DOE's NEPA regulations at 10 *CFR* 1021.216, which address integration of DOE's procurement and NEPA review processes, and requires a phased procurement that is contingent upon completion of the NEPA review process before a "go/no-go" decision. DOE's Request for Proposal required bids to include environmental data and analysis, to the extent that they were available. The environmental data provided in the three bids received were independently evaluated, and an Environmental Critique was prepared. DOE also prepared an Environmental Synopsis that was issued in January 1999 (Appendix A.2), which was based on the Environmental Critique. The Synopsis was filed with EPA and is publicly available. In addition, prior to selection of the contractor, DOE held two public meetings with stakeholders and had ongoing discussions with regulators.

The proposed site for the treatment facility is adjacent to the Melton Valley Storage Tanks (the storage area for the TRU mixed waste sludge and associated low-level supernate). DOE would lease the Melton Valley Storage Tanks and an adjacent land area totaling up to approximately 4 ha (10 acres) to the contractor selected for the construction of the facility (Figure S-4), subject to notification of the EPA and the State of Tennessee. Once the facility is closed and D&D of the facility is completed, the land used for the facility would no longer be leased to the selected contractor and would revert to DOE.

Figure S-4. DOE would lease the Melton Valley Storage Tanks facility and an adjacent area of land to construct the waste treatment facility. The location is isolated from ORNL by Haw Ridge.

The proposed facility location is based on the factors listed below:

- The treatment facility should be located close to the existing Melton Valley Storage Tanks to minimize the length of a new sludge/supernate transfer line and reduce the environmental disturbance due to construction as recommended in the *Feasibility Study for Processing ORNL Transuranic Waste in Existing and Modified Facilities* (Parallax 1995).

- The existing terrain should provide natural shielding for the proposed facility and facilitate material handling.

DOE would require that all activities associated with the proposed action be performed safely and in compliance with applicable federal and state regulatory requirements. The contractor would be responsible for achieving compliance with all applicable environmental and safety and health laws and regulations as required in the awarded contract. Regulatory agencies would be responsible for monitoring compliance by the contractor. The State of Tennessee would regulate the contractor according to permits under the state's purview (the RCRA Part B permit issued by the State of Tennessee). DOE would regulate occupational safety and health and nuclear safety according to specific environment, safety, and health requirements, as stipulated in the contract between DOE and Foster Wheeler.

S1.4.2 Alternatives

DOE analyzed five alternatives for the proposed action: a no action alternative; three alternative technologies for treating the wastes followed by shipment to an appropriate disposal facility; and treatment by any of the three alternative treatment technologies, followed by long-term storage at ORNL. Section S1.4.2 summarizes the following five alternatives:

1. **No Action** (i.e., continued on-site storage) for all of the legacy TRU tank waste and legacy contact-handled and remote-handled TRU/alpha low-level solid wastes.

2. **Low-Temperature During (Preferred Alternative)** for the Melton Valley Storage Tanks wastes (sludge and supernate) and segregation and compaction for the solid wastes (contact-handled and remote-handled TRU/alpha low-level heterogeneous debris).

3. **Vitrification** for the Melton Valley Storage Tanks wastes (sludge and supernate) and segregation and compaction for the solid wastes (contact-handled and remote-handled TRU/alpha low-level heterogeneous debris).

4. **Cementation** for the Melton Valley Storage Tanks wastes (sludge and supernate) and segregation and compaction for the solid wastes (contact-handled and remote-handled TRU/alpha low-level heterogeneous debris).

5. **Treatment and Waste Storage at ORNL** would provide treatment by one of the above treatment alternatives followed by long-term (indefinite) waste storage at ORNL.

The Treatment and Waste Storage at ORNL Alternative was analyzed as a contingency in case off-site waste disposal facilities would not be available for any reason.

Each treatment alternative analyzed included treatment approaches that would solidify the sludges and supernate, compact the solid wastes, and provide treatment for some mixed wastes to meet the land disposal restriction (LDR) standards. After waste treatment, DOE would certify the waste for disposal as low-level radioactive waste (including remote-handled low-level and alpha low-level radioactive waste), mixed low-level waste, or TRU waste (including mixed TRU waste). The contractor would be required to treat all wastes to meet specified waste acceptance criteria for disposal. For each treatment alternative, this section describes the treatment approach and general features (with detailed flow diagrams), waste products generated, waste minimization measures, land use requirements, and the proposed schedule.

Treated TRU waste resulting from the proposed action would be disposed of at the WIPP, consistent with the Records of Decision from the WIPP SEIS II (DOE 1998b) and the WM PEIS (DOE 1998c). The waste treatment methods analyzed in this draft EIS will treat remote-handled TRU sludge waste to meet RCRA LDR standards. This will allow the treated remote-handled TRU sludge waste to be stored onsite in the event that WIPP is not accepting remote-handled TRU waste in time to meet the TDEC Commissioner's Order.

The supernate, which is generally classified as low-level waste, would be disposed of at a DOE site, (i.e., the Nevada Test Site, or another facility designated in the WM PEIS Record of Decision for low-level waste). For impacts analysis purposes, all low-level waste resulting from the proposed TRU Waste Treatment Facility is assumed to be disposed of at the Nevada Test Site. This assumption is based on the initial characterization information for the low-level waste, which indicates that this waste meets the waste acceptance criteria of the Nevada Test Site. The final decision on the disposal site for low-level waste treated at the proposed TRU Waste Treatment Facility will be consistent with the pending Record of Decision for low-level waste from the WM PEIS. The Nevada Test Site is one of six candidate DOE low-level waste sites identified in the WM PEIS. On December 10, 1999, DOE issued a Notice of Preferred Alternatives (*FR* Vol. 64, No. 237, December 10, 1999), naming its specific preferred sites for low-level waste and mixed low-level waste disposal as the Hanford Site in Washington and the Nevada Test Site. The WM PEIS Record of Decision is expected to be issued before the ORNL TRU Waste Treatment Project Final EIS is completed. Because the ORNL TRU Waste Treatment Project would generate small quantities of low-level waste in comparison to the 1.5 million m^3 of low-level waste analyzed for the entire DOE complex in the WM PEIS, the assumption of the Nevada Test Site as a disposal site for low-level waste does not prejudice DOE's pending WM PEIS low-level waste disposal Record of Decision.

Because most of the current solid waste containers do not meet U.S. Department of Transportation (DOT) regulations (49 *CFR* 173), the solid waste would need to be repackaged prior to shipment. DOE would better characterize the solid waste during the repackaging efforts to achieve final DOE waste certification before disposal. Contact-handled and remote-handled solids containing RCRA regulated wastes would be isolated and treated to meet RCRA LDR standards.

S1.4.2.1 No Action Alternative

The No Action Alternative involves continued storage of mixed waste (RCRA hazardous and radioactive) TRU sludges and the associated low-level waste supernate in the Melton Valley Storage Tanks. Storage of contact-handled and remote-handled TRU/alpha low-level waste solids in the SWSA 5 North trenches would also continue. The remote-handled TRU/alpha low-level waste solids that are stored in Buildings 7855 and 7883 would remain in these units, and contact-handled TRU/alpha low-level solids currently stored in Buildings 7572, 7574, 7842, 7878, and 7879 would also remain in those units. In addition, the remote-handled TRU and certain contact-handled TRU wastes currently stored in the below-grade concrete cells in SWSA 5 North (Buildings 7826 and 7834) would be removed as part of a removal action under CERCLA and moved to existing facilities for remote-handled and contact-handled wastes at ORNL (described in Section 2.3.1 of this draft EIS).

No treatment facility would be constructed under the No Action Alternative. The No Action Alternative assumes institutional control for 100 years. Implementation of this alternative would result in noncompliance with the milestone established in the TDEC Commissioner's Order requiring the submittal of a Project Management Plan, which includes schedules for treatment and shipment of ORNL's TRU waste, by September 30, 2001, and would jeopardize the existing milestone established in the Commissioner's Order for initiation of shipment of the treated remote-handled TRU sludges to WIPP by January 2003.

S1.4.2.2 Low-Temperature Drying Alternative

The Low-Temperature Drying Alternative (Preferred Alternative: contingent contract to Foster Wheeler Environmental Corporation) would treat the TRU mixed waste sludge and associated low-level waste supernate by low-temperature drying. The solid wastes would be characterized, sorted, and compacted to result in stable waste forms for final disposal. A waste treatment facility would be constructed immediately adjacent to the Melton Valley Storage Tanks. Construction of the treatment facility would require the development of 2 ha (5 acres) of forested land for industrial use.

This alternative would entail evaporating and drying the TRU mixed waste sludges and associated low-level waste supernates. Treatment by low-temperature drying is expected to substantially reduce the waste volume, generate minimal amounts of secondary wastes, and meet the waste acceptance criteria of the final disposal facilities. All waste streams would meet the RCRA LDR standards in the event that unanticipated, on-site storage of the waste is required in order to coincide with the schedules of the appropriate disposal facilities. TRU waste streams would be treated to meet the waste acceptance criteria of the WIPP. Low-level waste streams would be treated to meet the waste acceptance criteria of the Nevada Test Site or another designated disposal site identified in the WM PEIS Record of Decision to be issued for management of low-level and low-level mixed waste.

The simplified block flow diagram for the tank waste treatment system (TRU mixed waste sludge and associated low-level supernate) is illustrated in Figure S-5. Treatment of the supernate and sludge could occur independently. Supernate would be pumped from the existing Melton Valley Storage Tanks through a double-contained, aboveground pipeline to the proposed treatment facility and collected into mixing/sample tanks. The supernate may be transferred to an evaporator for volume reduction before transfer to the mixing/sample tanks. In order to meet waste acceptance criteria for a low-level waste disposal facility evaluated in the WM PEIS (i.e., the Nevada Test Site, or another designated disposal facility), additives would be mixed with the supernate in these tanks. The supernate dryer would receive feed batches from the mixing/sample tanks for final concentration and drying into a stabilized particulate product. The treated waste would be loaded directly into a disposal container that is pre-loaded in a transportation cask for shipment. Vapors from the dryer would be routed through an air-cooled condenser. Condensate may be stored in a reservoir for reuse in sludge retrieval, or evaporated and discharged as part of the building ventilation flow through appropriate high-efficiency particulate air (HEPA) filtration.

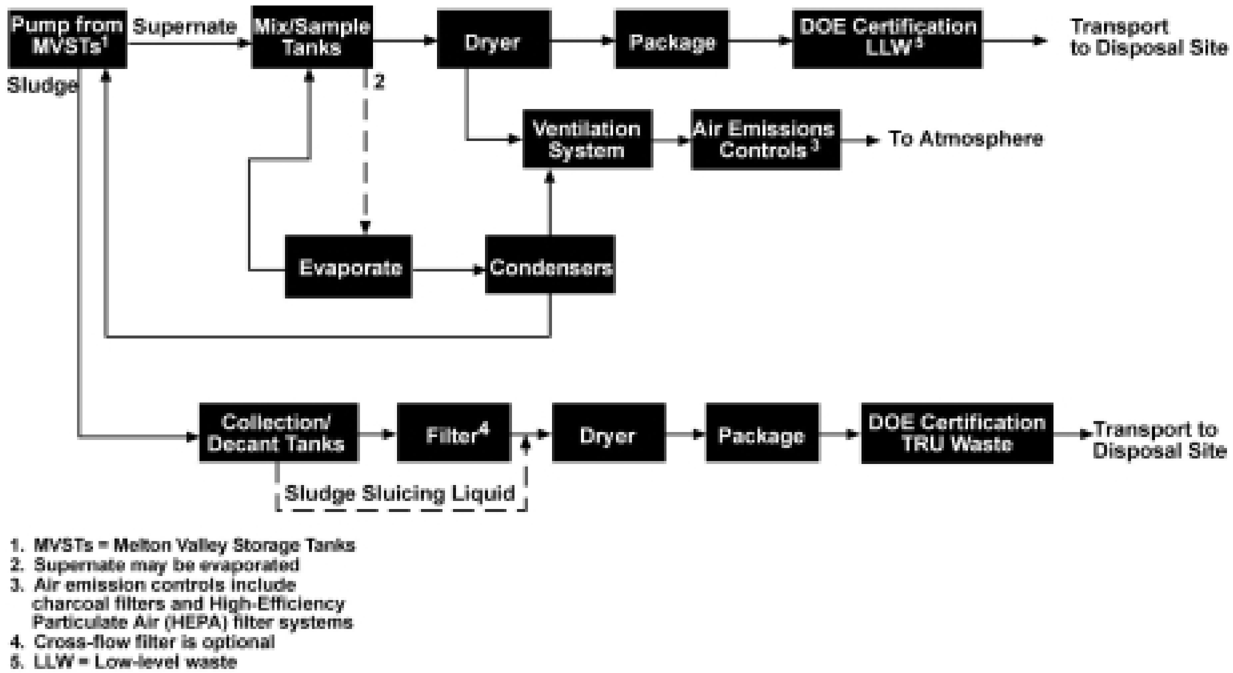

Figure S-5. Tank waste treatment flow diagram for the Low-Temperature Drying Alternative.

Sludge would be retrieved from the Melton Valley Storage Tanks by sluicing. The sluiced sludge would be transferred in a double-contained, aboveground pipeline to the sludge collection/decant tanks in the facility. The sludge would be concentrated by gravity settling in these tanks. Sluiced sludge may be filtered before transfer to the dryer. For optimum efficiency, the dried sludge solids would be packaged and loaded directly into WIPP TRU canisters.

DOE would deliver drums and boxes of the contact-handled and remote-handled TRU/alpha low-level solid wastes to the proposed treatment facility. Foster Wheeler would perform visual inspections and radiation and contamination surveys prior to acceptance of the waste containers. The drum contents would be characterized by performing a non-destructive examination and assay in an adjoining enclosure before transfer to a staging area. Any alpha low-level waste drums that do not contain TRU waste, or RCRA regulated waste, would be treated in a drum compactor for a 50% volume reduction, overpacked, weighed, and conveyed back to the shipping/receiving area for final certification by DOE. The simplified block flow diagram for the solid waste treatment systems is illustrated in Figure S-6.

The remote-handled TRU/alpha low-level waste drums would be moved to a hot cell in order to sort and separate any contact-handled waste from the remote-handled waste. Any contact-handled and remote-handled waste containing RCRA regulated waste would be treated to meet LDR standards by macroencapsulation. Waste that is compliant with LDR standards would be compacted and loaded into canisters docked at a load-out port on the hot cell. Over-sized remote-handled waste would be size reduced to fit into the canisters.

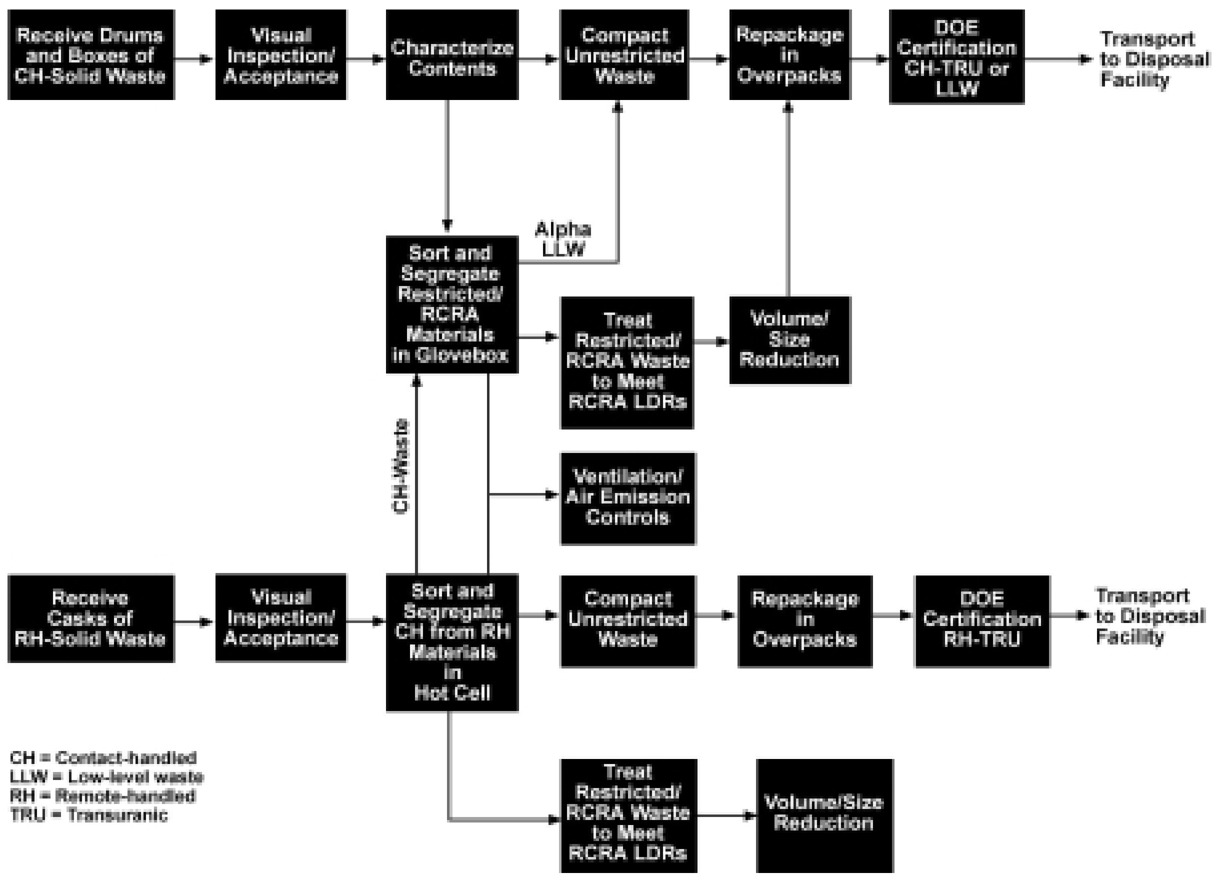

Figure S-6. Solid waste treatment flow diagram for the Low-Temperature Drying Alternative.

The contact-handled TRU/alpha low-level waste drums contents would be moved to a glovebox after the initial characterization, where RCRA regulated waste would be segregated for treatment by macroencapsulation to meet LDR standards. Unrestricted, contact-handled solid waste would be compacted in drums before transfer to the assay area for DOE certification. Secondary waste such as empty waste containers and personal protective equipment (PPE), etc., would be compacted prior to DOE certification for disposal at an appropriate facility.

The Low-Temperature Drying Alternative would result in a total of approximately 10,833 m^3 (3,843,546 ft^3) of waste; the largest portion of the total waste volume (5,550 m^3 or 19,423 ft^3) would be debris from D&D activities. Approximately 607 m^3 (21,439 ft^3) of treated TRU waste; 23 m^3 (812 ft^3) of mixed low-level waste; and 2,778 m^3 (98,108 ft^3) of low-level waste would be generated by this alternative. Pollution prevention and waste minimization measures would be implemented. For example, storm water would be diverted around the treatment facility, and gate valves would be installed in the diversion basins, in the event of a spill.

The total project duration for the Low-Temperature Drying Alternative is 11.5 years with a treatment time of approximately 5 years.

S1.4.3 Vitrification Alternative

The Vitrification Alternative would include vitrification of the TRU mixed waste sludge and associated low-level supernate (melting the waste to form a stabilized waste glass) in the Melton Valley Storage Tanks (Figure S-7). The contact-handled and remote-handled TRU/alpha low-level solid wastes would be segregated and compacted in a supercompactor. Some solids, however, that are smaller than the RCRA definition of debris, would be treated by vitrification. The vitrification waste treatment facility would be constructed next to the Melton Valley Storage Tanks. Construction of the treatment facility would require the development of 2.8 ha (7 acres) of forested land for industrial use.

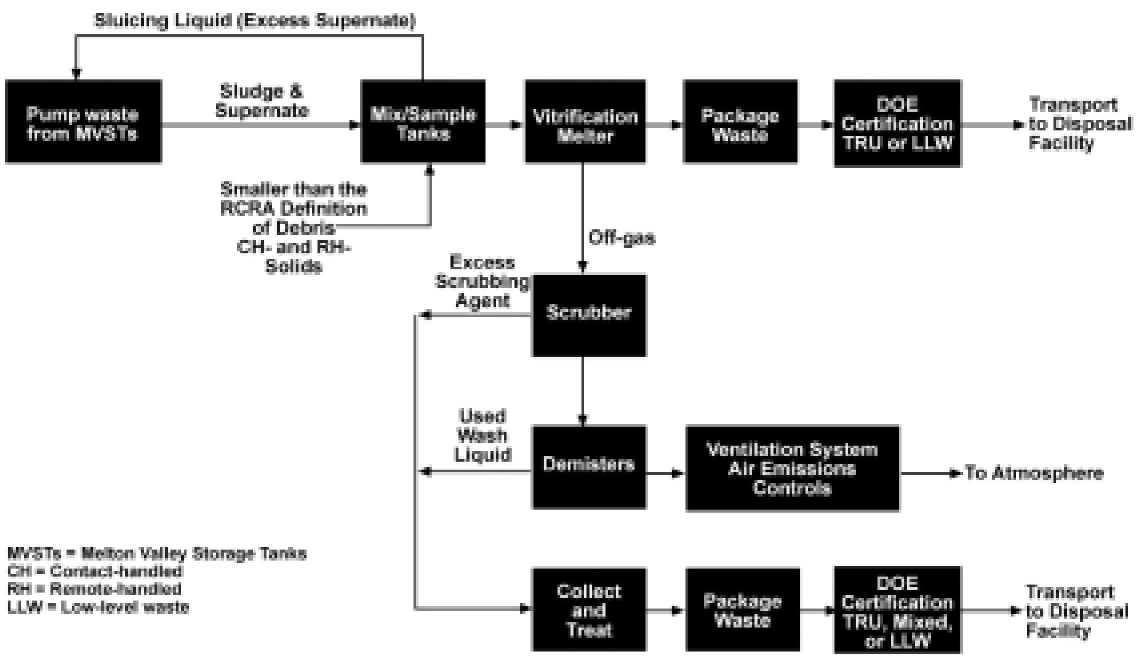

Figure S-7. Treatment flow diagram for sludge, supernate, and solid waste smaller than the RCRA definition of debris for the Vitrification Alternative.

Waste sludge and supernate would be pumped to the treatment facility through an aboveground, double-contained pipeline after retrieval by pulsed jet mixing. The waste would be homogenized in mix/sample tanks and the required glass-former blend would be determined after sampling the homogenized waste.

Dry glass-forming chemicals would be mixed with the homogenized waste, which would then be fed into the vitrification melter. The resulting molten glass waste would be poured into waste containers and allowed to harden. The final glass waste form would be certified by DOE as TRU or low-level waste for disposal at the appropriate disposal facility.

Off-gas from the melter would be minimized by maintaining a cold cap floating on top of the melted glass surface. The off-gas system, including a scrubber, demisters, and HEPA filters would remove over 99% of the off-gas particulates. Excess scrubbing agents and liquid from the demisters would be recycled or collected, treated, and packaged for DOE certification as TRU, mixed, or low-level waste before disposal at the appropriate disposal facility.

The remote-handled and contact-handled TRU/alpha low-level solid waste containers would be delivered to the facility by DOE (Figure S-8). Upon receipt, the surface dose rate would be monitored. The containers would be characterized and then their contents sorted in a hot cell. Some solid waste classified as smaller than the RCRA definition of debris would be sent to the vitrification treatment train. Any contact-handled or remote-handled waste containing RCRA regulated wastes would be macroencapsulated. Special waste materials such as batteries, aerosol cans, or glass bottles would be sent to a special treatment cell for treatment and packaging, or the vitrification treatment train if the waste matrix is compatible. The remaining remote-handled and contact-handled solid wastes would be sorted and segregated, and then volume and size reduced if required. Sorted waste containers would be characterized and weighed before compaction to provide DOE with information for waste certification. The compacted waste pucks would be placed in 55-gallon drums, grouted, and then placed in a buffer storage area until the grout hardens.

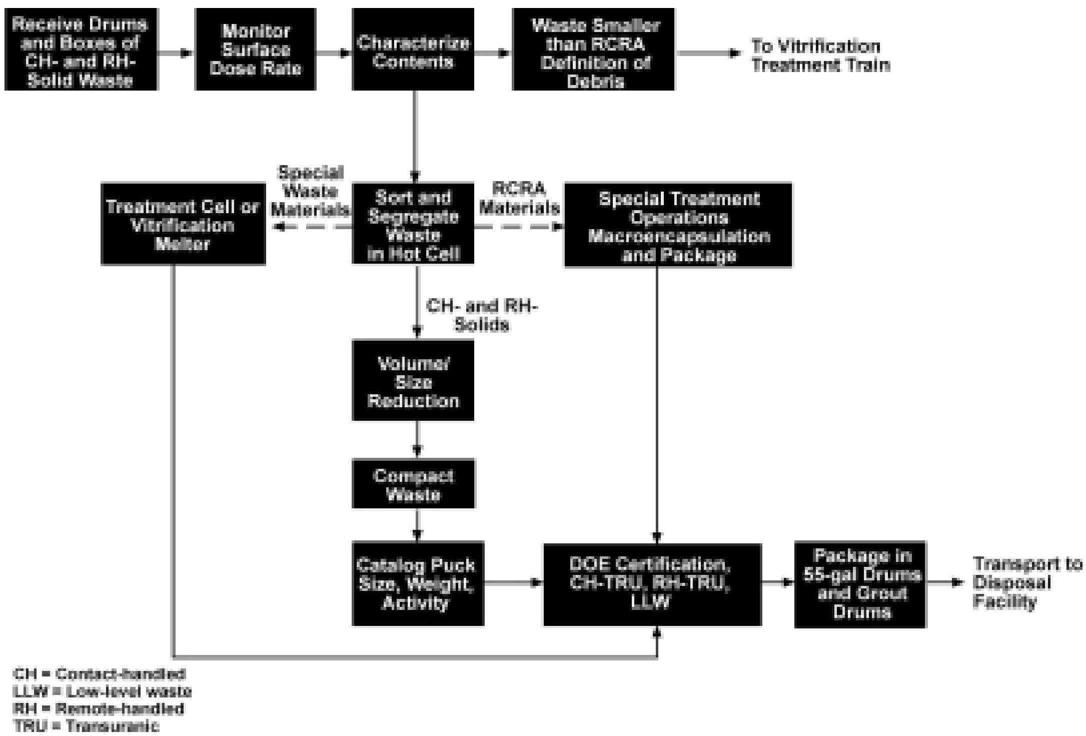

Figure S-8. Vitrification Alternative flow diagram for solid waste treatment.

The Vitrification Alternative would result in an estimated total of 34,000 m^3 (1,200,744 ft^3) of waste. Approximately 20,712 m^3 (731,464 ft^3) of debris from D&D activities and 6,283 m^3 (221,890 ft^3) of sanitary wastewater account for the largest portion of the total waste volume. Approximately 1,060 m^3 (3,743 ft^3) of TRU waste; 4 m^3 (141 ft^3) of mixed low-level waste; and 4,983 m^3 (175,979 ft^3) of low-level waste would result from the implementation of the Vitrification Alternative.

Pollution prevention and waste minimization measures would be implemented. For example, storm water would be diverted around the treatment facility, and gate valves would be installed in the diversion basins, in the event of a spill.

The total project duration of the Vitrification Alternative would be approximately 10 years, with about 3 years of waste treatment. Following 3 months of cold operations (with non-radioactive materials) after construction of the facility, hot operations (with radioactive materials) would be conducted for about 2.75 years.

S1.4.4 Cementation Alternative

The Cementation Alternative would include hydrocyclone and centrifuge pre-treatment separation of the TRU mixed waste sludge and associated low-level supernate contained in the Melton Valley Storage Tanks, followed by cementation of the pre-treated wastes. The contact-handled and remote-handled TRU/alpha low-level solid wastes would be characterized, then segregated and compacted similar to the treatment methods described in the Vitrification Alternative for solid waste. The Cementation Alternative would require the construction of a treatment facility that would be located on 2 ha (5 acres) of land that would change from forested land to industrial use.

Sludge and supernate would be retrieved from the Melton Valley Storage Tanks by sluicing. The waste slurry would be pumped through an aboveground double-contained pipeline to storage tanks inside the cementation treatment facility (Figure S-9). A hydrocyclone in series with a centrifuge would separate the sludge from the supernate. The majority of supernate would be recycled through the Melton Valley Storage Tanks to aid in sludge retrieval operations. The slurry discharge from the centrifuge would be maintained at 25% weight total suspended solids and would be collected in feed tanks, which would allow continuous transfer to the cementation facility mixer.

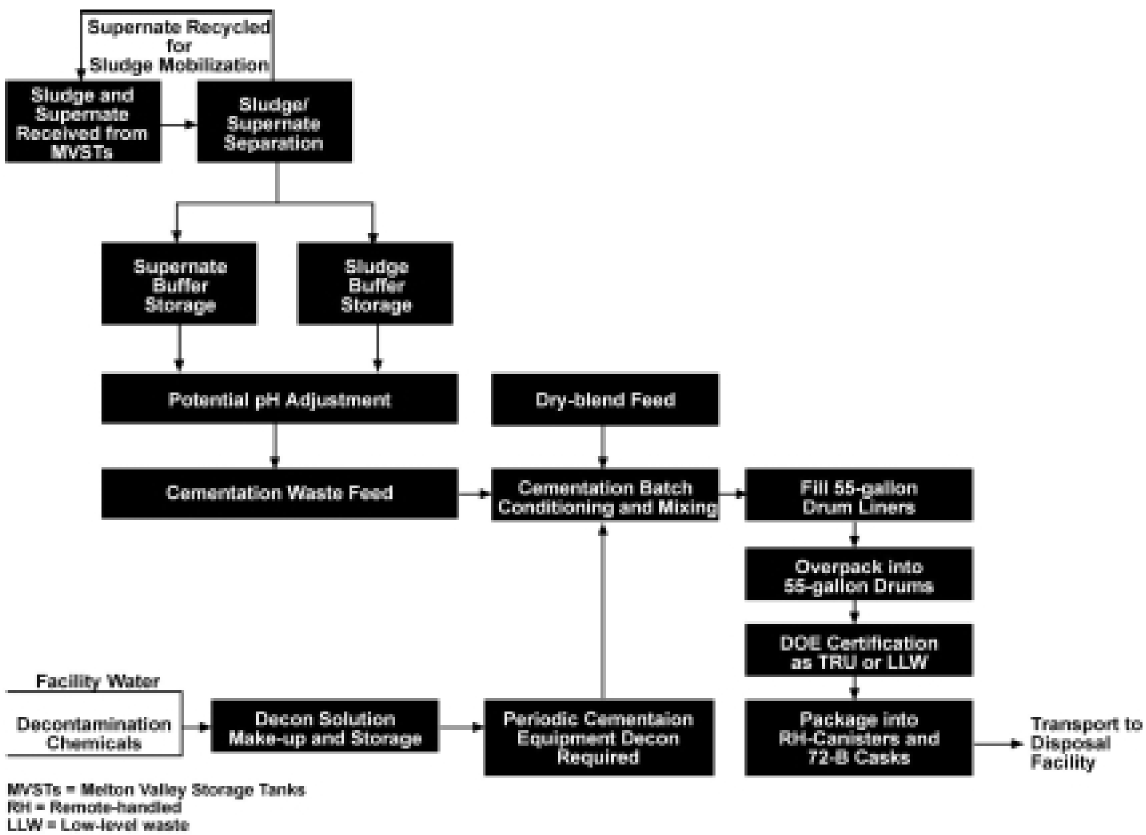

Figure S-9. Flow diagram for tank waste treatment for the Cementation Alternative.

A dry blend storage tank would store premixed cementation/stabilization agents. Treatment would oscillate between the supernate and sludge wastes from the feed tanks. Approximately 3.1 kg (7 lbs) of dry blend would be added per gallon of sludge from the centrifuge process, and 5 kg (1l lbs) of dry blend would be added per gallon of supernate from the centrifuge process to obtain a stabilized waste form. The dry blend would be transferred to the cementation mixer via a weigh belt feeder. After mixing the dry blend and waste, the resulting grout mixture would be pumped into 50-gallon drum liners, which would remain on a conveyor system until hardened, and then be placed inside 55-gallon carbon steel overpack drums. After passing remote external surface contamination analysis, the drums would be placed in remote-handled canisters and then into 72-B casks. The treated TRU sludge waste would be certified by DOE and disposed at the WIPP. The treated supernate would be remote-handled low-level waste and would be disposed of at the Nevada Test Site or another facility designated in the WM PEIS Record of Decision for low-level waste.

The Cementation Alternative would treat the contact-handled and remote-handled TRU/alpha low-level solid wastes with the same methods described previously for the Vitrification Alternative (Section S1.4.3), with the exception that none of the solid waste classified as smaller than debris by RCRA would be segregated and treated separately. This waste would be treated with the larger solid waste. Any RCRA regulated waste would be segregated and treated by macroencapsulation.

The Cementation Alternative would result in an estimated total of 28,826 m^3 (1,018,019 ft^3) of waste. Debris from D&D activities (14,111 m^3 or 498,344 ft^3) and sanitary wastewater and solids (7,237 m^3 or 255,581 ft^3) account for most of the total waste volume. The Cementation Alternative would result in 1,793 m^3 (63,321 ft^3) of treated TRU wastes; 2,540 m^3 (89,702 ft^3) of remote-handled low-level waste; 2,833 m^3 (100,050 ft^3) of low-level waste; and 3 m^3 (106 ft^3) of mixed low-level waste.

Pollution prevention and waste minimization measures would be implemented. For example, storm water would be diverted around the treatment facility, and gate valves would be installed in the diversion basins, in the event of a spill. The off-gas system would minimize air emissions, and liquid used for the decontamination of the cementation treatment system would be transferred back into the cementation treatment system as waste minimization measures.

The total project duration of the Cementation Alternative is approximately 12.5 years, with 6 years involving waste treatment. The Cementation Alternative would require a longer waste treatment time than the other waste treatment alternatives, which would reduce the radiochemical and particulate emissions in a given year. The longer treatment time is the result of the shipment capacity allotment given by the WIPP to each approved shipper of certified TRU waste. If the shipment allotment from the WIPP were not a limiting factor, and an assumption was made that the treated waste could be stored at ORNL in the interim, then the sludge and supernate could be treated by the cementation treatment method in 1 or 2 years.

S1.4.5 Treatment and Waste Storage at ORNL Alternative

This alternative analyzes the treatment of the sludge and supernate contained in the Melton Valley Storage Tanks, by either low-temperature drying, vitrification, or cementation. The contact-handled and remote-handled TRU/alpha low-level solid waste currently stored in bunkers, subsurface trenches, and metal buildings would be sorted, segregated, and treated by compaction as described in the previous treatment alternatives. This alternative would include long-term storage of the treated waste at ORNL following waste treatment in case off-site waste disposal facilities are not available. It is assumed that waste storage would be for 100 years. Depending upon the selected treatment method, an additional 0.3 to 0.8 ha (0.75 to 2.0 acres) of land would be required for on-site storage of the low-level and TRU waste that would result from the treatment method selected (Table S-1). Implementation of this alternative would result in noncompliance with the milestone established in the TDEC Commissioner's Order requiring the submittal of a Project Management Plan (which includes schedules for treatment and shipment) by September 30, 2001, and would also jeopardize the existing milestone established in the Commissioner's Order that requires the initiation of shipment of the stabilized remote-handled TRU sludges to the WIPP by January 2003.

It may be possible to use the existing remote-handled TRU waste bunkers for storage of the treated TRU, mixed low-level waste, and remote-handled handled low-level wastes; however, these two bunkers (Buildings 7855 and 7883) only have a total waste storage capacity of 320 m^3 (11,318 ft^3). It is also assumed that the existing facilities for contact-handled TRU waste, which have a combined capacity of 1,631 m^3 (57,632 ft^3), could be used for treated low-level waste storage. Table S-1 provides a summary of the resulting waste volumes of the three waste treatment alternatives and the space required for the construction of the waste storage facilities. If this alternative were chosen, it is assumed that an engineering analysis would indicate that the existing TRU waste bunkers could be used to store treated remote-handled TRU waste, remote-handled low-level waste, and mixed waste. It is assumed that new waste storage facilities would be located in the Melton Valley area of ORNL, preferably near the waste treatment facility, or the existing TRU waste storage facilities. It was also assumed that the new storage building footprints would be similar to the existing storage facilities, and have a similar waste storage capacity [approximately 150 m^3 (5,297 ft^3) for remote-handle TRU waste, remote-handled low-level waste, and mixed waste, and approximately 300 m^3 (10,594 ft^3) for other waste types].

The schedule for waste treatment for the Treatment and Waste Storage at ORNL Alternative would be similar to the schedule for the treatment alternatives selected (please refer to previous sections for a description of the schedules that would be implemented for waste processing by low-temperature drying, vitrification, or cementation). It is assumed that the time needed to construct waste storage facilities would be similar to the time needed to construct the treatment facility (about 2 years).

Table S-1. Summary of the TRU, mixed low-level, remote-handled low-level, and low-level waste volumes, the resulting new storage space required for each treatment alternative, and the land area required for additional storage facilities

	Low-Temperature Drying	Vitrification	Cementation
Table S-1a. Summary of the TRU, mixed low-level, and remote-handled low-level waste volumes and new storage space required			
Treated TRU waste volume (m^3)	607	1,060	1,793
Mixed low-level waste volume (m^3)	23	4	3
Treated remote-handled low-level waste volume (m^3)	–	–	2,540[a]
***Total TRU, mixed, and remote-handled low-level waste requiring on-site storage* (m^3)**	630	1,064	4,336
Existing waste bunkers storage capacity (m^3)	320	320	320
***New storage capacity needed* (m^3)[b]**	310	744	4,016
Assumed capacity of single new waste bunker (m^3)	150	150	150
Number of new waste bunkers needed	3	5	27
Assumed area of new waste bunker (m^2)	234	234	234
***Total Storage Facility Area required for TRU, mixed, and remote-handled low-level wastes* (m^2)**	702	1,161	6,265
Table S-1b. Summary of low-level waste volumes and new storage space required			
***Total low-level waste requiring on-site storage* (m^3)**	2,778 [a]	4,983 [a]	2,833 [a]
Existing storage capacity (metal building)	1,631	1,631	1,631
***New storage capacity needed* (m^3) [b]**	1,147	3,352	1,202
Assumed capacity of single new metal building (m^3)	300	300	300
Number of new metal buildings needed	4	11	4
Area of new metal buildings (m^2)	375	375	375
***Total area required for low-level wastes* (m^2)**	1,434	4,190	1,503
Table S-1c. Total area required for all waste types and the associated land requirements for the new storage facilities			
TOTAL FACILITY SPACE REQUIRED FOR ALL WASTE TYPES (m^2)	**2,136**	**5,351**	**7,768**
TOTAL HECTARES REQUIRED FOR NEW WASTE STORAGE FACILITIES[c]	**0.3**	**0.6**	**0.8**

[a]Total waste volumes include alpha-low-level waste.

[b]Determined by subtracting available capacity from resulting waste volume and dividing by assumed storage capacity of new facility (150 m^3 for TRU, mixed, and remote-handle low-level wastes, and 300 m^3 for low-level wastes).

[c]Determined by summing storage space required for all waste types, for each treatment method, and converting to hectares.

S1.5 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN DETAIL

S1.5.1 Off-site Waste Treatment

Currently there is no facility available or planned at any DOE site that could treat remote-handled TRU mixed waste sludge and associated low-level waste supernate stored at ORNL. The Idaho National Engineering and Environmental Laboratory (INEEL) is planning to process its contact-handled TRU on-site waste at the planned Advanced Mixed Waste Treatment Project facility; however, using the planned INEEL facility to treat ORNL TRU waste would be difficult for the following reasons:

- Because the planned INEEL facility is being constructed to process the contact-handled TRU waste at INEEL, the ORNL remote-handled TRU waste may not meet the planned facility's waste acceptance criteria.

- Most of the ORNL remote-handled and contact-handled TRU/alpha low-level solid waste containers do not meet DOT standards (49 *CFR* 173). These containers would require repackaging prior to transport offsite; therefore, it would be safer and more economical for the treatment of solid waste to be conducted at ORNL, and for the treated waste to be shipped directly to the WIPP or the low-level waste disposal sites.

- After treatment at INEEL, the ORNL treated waste would require a second redundant step of repackaging and DOE certification before the waste could be transported to the WIPP or low-level waste disposal site for disposal, resulting in additional worker exposures and cost.

Treatment of the ORNL TRU wastes at INEEL is unreasonable because of the increased costs and risks associated with preparing the tank waste for shipment, repackaging and certifying the waste twice, transporting the waste to INEEL for treatment, and then transporting the treated waste to the WIPP or the low-level waste disposal sites.

S1.5.2 Alternate On-site Treatment Facility Locations

Several factors were considered in selecting the site of the proposed on-site treatment facility. These factors are discussed in Section S1.4 and include minimizing the length of any sludge/supernate waste transfer line from the Melton Hill Valley Storage Tanks to the proposed treatment facility, using the terrain to provide natural shielding for the proposed facility, and considering recommendations made in a feasibility study that focused on dealing with the tank wastes.

The proposed site is directly west of the Melton Valley Storage Tanks, which is the current storage area for the TRU mixed waste sludge and associated low-level supernate. This location reduces the potential risks associated with transporting the liquid and sludge tank wastes from the Melton Valley Storage Tanks to the proposed treatment facility over public or laboratory roads. Since the solid waste storage facilities are also located in Melton Valley, the transportation of the solid wastes would only occur on laboratory roads, also reducing the risk to the public. Melton Valley, while considered part of ORNL, is separated from the ORNL main plant area by the Haw Ridge (Figure S-1), thus reducing potential risks to the main body of workers at ORNL from accidental releases. Alternative site locations were not evaluated in detail because other on-site locations did not meet the siting factors.

S1.5.3 Alternative Disposal Locations

TRU waste will be disposed of at the WIPP in accordance with the WIPP SEIS-II Record of Decision (DOE 1998b) for TRU waste. The analysis in this EIS assumes that all low-level waste resulting from the ORNL TRU Waste Treatment Facility will be disposed of at the Nevada Test Site. The Nevada Test Site waste acceptance criteria would allow disposal of alpha low-level waste; however, the disposal of any low-level waste generated from this action will be consistent with the pending Record of Decision for low-level waste from the WM PEIS. The WM PEIS Record of Decision for low-level waste is expected to be issued before completion of the final EIS for the TRU Waste Treatment Project at ORNL. Because the project would generate small quantities of low-level waste in comparison to the 1.5 million m^3 of low-level waste analyzed for the entire DOE complex in the WM PEIS, the assumption of disposal of low-level waste at the Nevada Test Site does not prejudice the WM PEIS Record of Decision for low-level waste.

S1.5.4 Alternative Treatment Technologies

Sixteen stabilization and solidification technologies were identified and evaluated as candidates for processing TRU waste sludge in the *Feasibility Study for Processing ORNL Transuranic Waste at Existing and Modified Facilities* (Parallax 1995), but were not analyzed further because they were not considered reasonable (see Chapter 2, Table 2-5). One of the technologies, plasma arc vitrification, was also identified as potentially useful for solid remote-handled and contact-handled TRU/alpha low-level waste. However, it would not be feasible to use a technology for the solid wastes unless it was also used for the sludge and supernate. Because of cost, scaling, and permitting issues, this technology was eliminated from further consideration.

S1.6 AFFECTED ENVIRONMENT

Chapter 3 of this EIS describes the existing environment in and around ORNL which would be affected by the construction, operation, and D&D of the proposed TRU Waste Treatment Project facility. Site-specific information for the area surrounding the proposed facility site and the adjacent Melton Valley Storage Tanks at ORNL is also included. Current, pertinent information is provided for the Region of Influence for the various resource areas, and the supporting references are cited.

S1.6.1 Land Use

The proposed site is in a forested area immediately west and adjacent to the Melton Valley Storage Tanks and approximately 2 km (1.25 miles) east of Tennessee State Route 95. The Melton Valley Storage Tanks are active waste storage tanks, which store legacy TRU mixed waste sludge and its associated remote-handled low-level supernate. The area west of the proposed facility site is industrial. The proposed site for the treatment facility does not contain prime or unique farmland. The landscape at the proposed site is a mixture of industrial facilities, roads, and utility buildings and equipment.

S1.6.2 Cultural Resources

The proposed site has no known archaeological, cultural, or historic resources. This has been confirmed by site investigations and by consultation with the State Historic Preservation Officer. However, two pre-1940s home sites—known respectively as the Jenkins and Jones sites—are located within 600 feet of proposed site location. There are no known areas of historical importance to Native Americans at the proposed project site.

S1.6.3 Ecological Resources

Succession on the fields of former homesteads has produced a relatively young to mid-age open forest of pines and cedars with dominant tree species of shortleaf and Virginia pine, yellow poplar, red bud, and maples in the vicinity of the proposed project site. Fauna at the site include rat snakes, black racers, red-eyed vireos, pine warblers, scarlet tanagers, wild turkey, red-tailed hawks, white-footed mice, coyotes, gray squirrels, flying squirrels, and white-tailed deer. There are no federally listed terrestrial plant species on the proposed site; the only federally listed animal species recently observed on the ORR are the gray bat and the bald eagle, and these are migratory or transient individuals and not permanent residents.

No federally listed aquatic plant species was found in the proposed project site area; however, two Tennessee State-listed wetland species, the purple fringeless orchid and the river bulrush, may be present in wetlands adjacent to the proposed site. The only Tennessee State-listed aquatic-related fauna is the osprey, which is a common nester in Melton Valley.

S1.6.4 Geology and Seismicity

The ORR is located in the Tennessee Section of the Valley and Ridge physiographic province. The Conasauga Group underlies the Melton Valley, and the proposed project site would be situated over the Cambrian-age Nolichucky Shale. Tectonic activity has produced extensive fracturing and localized folding of bedrock units. Soil contamination exists in many locations in the Melton Valley area of ORNL, which is heavily used for waste storage.

The ORR is located in Seismic Zone 2, where the probability of seismic damage is moderate.

S1.6.5 Water and Water Quality

The proposed project site is within the Melton Valley Watershed portion of the White Oak Creek Watershed, which has a drainage area of 6.15 square miles. Although there are no permanent water bodies within the site boundary, two perennial streams (White Oak Creek and Melton Branch) and an unnamed tributary to White Oak Creek, and one lake (White Oak lake) would be close to the proposed facility.

Surface water from White Oak Creek, White Oak Lake, and Melton Branch contains elevated levels of radionuclides, mercury, and polychlorinated biphenyls (PCBs) relative to reference streams. However, overall water quality is good, such that no toxicity to aquatic organisms had been observed for several years and the toxicity testing was discontinued in 1997.

Groundwater is being contaminated from wastes in the unlined trenches at SWSA 5 North. According to the *Remedial Investigation Report on the Melton Valley Watershed at Oak Ridge, Tennessee* (DOE 1997f), these unlined trenches at SWSA 5 North are estimated to contain 14,000 curies and contribute about 6% of the total strontium-90 and 3.6% of the cesium-137 released to surface water in Melton Valley. The rate of release of radioactive constituents will likely reduce with respect to time because of radioactive decay. The contaminated soils around the underground trenches, and between the trenches and White Oak Creek, will also act as a secondary source of contamination to groundwater. Well samples taken adjacent to the SWSA 5 North trenches also showed elevated levels of americium-241 and curium-244 ranging as high as 5,940 pCi/L.

There are six wetlands within 0.8 km (0.5 miles) of the proposed TRU Waste Treatment Facility. The site is not within a floodplain, but the 100-year and 500-year floodplains associated with White Oak Creek are immediately north of the proposed site.

S1.6.6 Waste Management

The estimated waste volumes associated with CERCLA cleanup actions for the ORR range between 170,495 m^3 and 841,005 m^3 (223,000 to 1.1 million yd^3). Remote-handled TRU sludge will no longer be generated at ORNL after Fiscal Year 2000, but approximately 5.5 m^3 of remote-handled TRU waste would be generated annually at the Radiological Engineering Development Center at ORNL.

S1.6.7 Climate and Air Quality

The proposed facility is in an air quality control region, which is an attainment area for all criteria pollutants. ORR and ORNL are in compliance with all federal air regulations and TDEC air-permit requirements for non-radioactive hazardous air pollutants. The ORR is within a Class II prevention of significant deterioration area. Prevailing winds in the area are up-valley in the daytime and down-valley at night.

S1.6.8 Transportation

Transportation corridors in the region and immediately adjacent to the ORR boundary consist of local access roads such as Tennessee State Routes 95, 1700, and 62, and Interstates I-40 and I-75. The High Flux Isotope Reactor access road provides direct access from Tennessee State Route 95 to the proposed site.

S1.6.9 Utility Requirements

The Tennessee Valley Authority provides electric power to the ORR, which has a current site load of 166 MW. Water is supplied to ORNL by the DOE Oak Ridge Water Treatment Facility, which draws water from the Clinch River.

S1.6.10 Human Health

The calculated doses to the off-site (public) maximally exposed individual at ORNL and ORR are shown in Table S-2 (ORNL 1998). Airborne releases of radionuclides for the ORNL maximally exposed individual in 1997 resulted in a probability of cancer fatality of 2E-07. ORNL contributed about 58% of the ORR collective effective dose equivalent, or about 5.8 person-rem for the population, which corresponds to a Latent Cancer Fatality (LCF) of 3E-03 annually. For airborne releases the estimated probability of cancer fatality for the maximally exposed individual at ORR in 1997 was 2E-07, and the LCF for the collective population was 5E-03 annually.

Table S-2. Calculated effective dose equivalent to the maximally exposed off-site individual and the collective population effective dose equivalent from airborne releases of radionuclides in 1997 (ORNL 1998)

Location	Effective dose equivalent to a maximally exposed individual (mrem)	Probability of cancer fatality for the maximally exposed individual	Collective population effective dose equivalent (person-rem)	Latent Cancer Fatalities for collective population
ORNL	0.38	2E-07	5.8	3E-03
ORR	0.41	2E-07	10.0	5E-03

Doses from ingestion of fish contaminated from the Clinch River are estimated at 0.045 mrem (effective dose equivalent) for a maximally exposed individual, which would result in the probability of a cancer fatality of 2.3E-08. The collective population dose is 0.017 person-rem, which would result in an LCF of 8.5E-04. A fisherman spending 250 hours per year along the bank of the Clinch River would receive a dose from direct radiation of 1 mrem, which would result in a probability of a cancer fatality of 5E-07.

External exposure rates from background sources in Tennessee average about 6.4 microroentgens per hour (μR/hour) and range from 2.9 to 11 μR/hour. These exposure rates are equivalent to an average annual effective dose equivalent of 42 mrem/year and range from 19 to 72 mrem/year. The total average dose due to background radiation received by an individual in the United States, including the 42 mrem, each year is about 300 mrem.

Operations at ORNL result in the release of small quantities of chemicals (NAAQS criteria pollutants) to the atmosphere. A steam plant and two small, oil-fired boilers are the largest emission sources and account for 98% of all allowable emissions at ORNL. Data for these non-radiological sources are presented in Table 3.17 of this EIS.

S1.6.11 Accidents

The total recorded injuries at ORNL for 1999 were 170 or 4.65 per 100 full-time employees working one year.

S1.6.12 Noise

The results of a noise survey conducted at the site for the proposed treatment facility in July 1999 indicated the area was relatively quiet. Daily equivalent noise levels ranged from 50 to 70 dBA and were highest when the High Flux Isotope Reactor access road was under construction. A secondary night-time noise peak reflected wildlife noises.

S1.6.13 Socioeconomics

Approximately 7,500 people reside within 8 km (5 miles) of the center of the ORR, and 880,000 people reside within 80 km (50 miles) of the proposed facility. Total regional income in 1996 was $12.0 billion.

S1.6.14 Minority and Low-Income Populations

Oak Ridge City census tracts in 1990 indicated a 10% or less African-American population, with the exception of one tract, which had a 34.4% African-American population. These values compare to an African-American population of 24.1% nationally and 17% for the State of Tennessee. There are two census tracts with low-income populations exceeding both the national average and the Tennessee state average. There are no federally recognized Native American groups within 80 km (50 miles) of the proposed site.

S1.7 ENVIRONMENTAL CONSEQUENCES

Table S-3 provides a summary of the potential environmental impacts associated with implementing the alternatives, and allows a comparison of the alternatives. All impacts are expected to be small. The primary differences among alternatives are in potential impacts to water resources, the volume of waste generated, the number of transportation shipments and associated accidents, and utility requirements.

Table S-3. Comparison of impacts among alternatives

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Land use (Chapter 4, Section 4.1)	• No change in land use, land use classifications, or impacts to visual resources	• No change in land use classification • 2 hectares (ha) (5 acres) would change from underdeveloped to industrial use • Buildings and other structures would be visible to workers but not the public	• No change in land use classification • 2 to 2.8 ha (5 to 7 acres) would change from underdeveloped to industrial use • Buildings and other structures would be visible to workers but not the public	• No change in land use classification • 2 ha (5 acres) would change from underdeveloped to industrial use • Buildings and other structures would be visible to workers but not the public	• No change in land use classification • 2 to 2.8 ha (5 to 7 acres) would change from underdeveloped to industrial use • For waste storage after treatment, an additional 0.3 ha (0.75 acre) of land would be required if treatment was by low-temperature drying, 0.6 ha (1.5 acres) of land if by vitrification, or 0.8 ha (2.0 acres) of land if by cementation • Buildings and other structures would be visible to workers but not the public
Cultural and historic resources (Chapter 4, Section 4.2)	• No cultural, archeological, or historic resources in project area	• Same as No Action Alternative	• Same as No Action Alternative	• Same as No Action Alternative	• Same as No Action Alternative

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Ecological resources (Chapter 4, Section 4.3)	• Continued release of waste constituents from SWSA 5 North trenches to soils and groundwater affecting biota • No habitat destruction under normal operations	• 2 ha (5 acres) of forested habitat lost and converted to industrial use (revegetated after facility D&D) • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• 2 to 2.8 ha (5 to 7 acres) of forested habitat lost and converted to industrial use (revegetated after facility D&D) • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• 2 ha (5 acres) of forested habitat lost and converted to industrial use (revegetated after facility D&D) • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• 2 to 2.8 ha (5 to 7 acres) of forested habitat lost and converted to industrial use • Low-quality habitat indefinitely lost for on-site waste storage facility construction; 0.3 ha (0.75 acre) of land required if treatment by low-temperature drying, 0.6 ha (1.5 acres) of land if by vitrification, and 0.8 ha (2.0 acres) of land if by cementation • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Geology and seismicity (Chapter 4, Section 4.4)	• No impact to geology or regional seismicity • No construction-related impacts to soils or geology • Continued release of waste constituents from the SWSA 5 North trenches to soils	• No impact to geology or regional seismicity • 2 ha of soil disturbed • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• No impact to geology or regional seismicity • 2.8 ha of soil disturbed • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• No impact to geology or regional seismicity • 2 ha of soil disturbed • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• No impact to geology or regional seismicity • 2 to 2.8 ha of soil disturbed • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA
Surface water (Chapter 4, Section 4.5.1)	• Continued release of waste constituents from the SWSA 5 North trenches to surface water	• Potential for increased siltation in White Oak Creek, Melton Branch, and an unnamed tributary • Reduction of soil and water contamination because treatment would be available for waste to be removed from trenches under CERCLA	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative
Groundwater (Chapter 4, Section 4.5.2)	• No groundwater use • Continued release of waste constituents from SWSA 5 North trenches	• No groundwater use • Positively impacts groundwater due to waste removal and treatment of waste from SWSA 5 North trenches	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Wetlands & Floodplains (Chapter 4, Section 4.5.3)	• Continued impacts to White Oak Creek floodplain due to SWSA 5 North contamination • No impact to wetlands	• Small impact to the 100-year or 500-year floodplains during construction phase • Wetland B (0.012 ha or 0.03 acres) would be eliminated by construction	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative
Waste Management (Chapter 4, Section 4.6)	• TRU sludge wastes and associated low-level supernate in the Melton Valley Storage Tanks, solid wastes in SWSA 5 North trenches, and solid waste in storage facilities would remain untreated • Would require continued surveillance and maintenance of untreated legacy waste inventory and associated on-site facilities indefinitely at ORNL • Would result in violation of legal mandate due to continued waste storage, potentially resulting in fines	• All legacy wastes in proposed action would be treated • Approximately 10,833 m^3 of total generated waste, including: – 607 m^3 contact-handled and remote-handled TRU waste; – 2,778 m^3 low-level waste; – 23 m^3 of low-level mixed waste; – 1,560 m^3 of sanitary wastewater; and – 5,550 m^3 debris from D&D activities	• Same as Low-Temperature Drying Alternative • Approximately 34,128 m^3 of total waste generated, including: – 1,060 m^3 contact-handled and remote-handled TRU waste; – 4,980 m^3 low-level waste; – 4 m^3 of low-level mixed waste; – 7,201 m^3 of sanitary wastewater; and – 20,760 m^3 debris from D&D activities	• Same as Low-Temperature Drying Alternative – Approximately 28,826 m^3 of total waste generated, including: – 1,793 m^3 contact-handled and remote-handled TRU waste; – 2,833 m^3 low-level waste; – 2,540 m^3 of remote-handled low-level waste; – 3 m^3 of low-level mixed waste; – 7,437 m^3 of sanitary wastewater; and – 14,143 m^3 debris from D&D activities	• Same as Low-Temperature Drying Alternative • 10,833 to 34,128 m^3 of waste generated, depending on the treatment selected, and stored on-site • Would require continued surveillance and maintenance of waste inventory indefinitely onsite at ORNL • Would require construction of additional waste storage facilities—using 0.3 to 0.8 ha of land depending upon treatment process selected

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Climate and Air Quality (Chapter 4, Section 4.7)	• No impact to air quality	• Minor emissions during normal operations	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative
Transportation (Chapter 4, Section 4.8)	• No off-site shipments	• 397 shipments of TRU waste with 3.2E-01 accidents and 4.4E-02 fatalities predicted • Non-accident latent cancer fatalities (LCFs) of 8.7E-02 for CH TRU and 3.1E-02 for RH TRU waste • 277 low-level waste shipments with 2.6E-01 accidents and 3.6E-02 accident fatalities predicted • 2.1E-09 non-accident LCFs predicted	• 987 shipments of TRU waste with 8.0E-01 accidents and 1.1E-01 fatalities predicted • Non-accident LCFs of 5.3E-03 for CH TRU and 9.3E-02 for RH TRU waste • 281 low-level waste shipments with 2.6E-01 accidents and 3.6E-02 accident fatalities • 2.1E-09 non-accident LCFs predicted	• 2,425 shipments of TRU waste with 2.2 accidents and 3.0E-01 fatalities predicted • Non-accident LCFs of 5.3E-02 for CH TRU and 2.7E-01 for RH TRU waste • 914 low-level waste shipments with 8.8E-01 accidents and 1.2E-01 accident fatalities predicted • 7.5E-09 non-accident LCFs predicted	• No off-site shipment of TRU waste or low-level waste • Requires on-site transportation of processed waste to on-site waste storage facilities

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Utility Requirements (Chapter 4, Section 4.9)	• Total estimated power usage 2,200 MW • 5 million gallons of water use projected over 100-year institutional control period	• About 15,000 MW of total electricity usage • 5 million gallons of water use during project life	• About 45,000 MW of total electricity usage • 7 million gallons of water use during project life	• About 11,250 MW of total electricity usage • 15 million gallons of water use during project life	• Electricity use varies by alternative from 13,450 MW to 47,200 MW total, which includes electricity use for long-term storage • Water use varies by alternative (10 million to 20 million gallons), which includes water use for long-term storage
Human Health (Chapter 4, Section 4.10)	• LCF for involved worker population estimated to be 2E-02 • Risk to public and non-involved worker would be negligible	• Probability of cancer fatalities (PCF) from radiological releases to involved worker estimated to be 3.0E-05; non-involved worker estimated to be 2.0E-05; and off-site MEI estimated to be 1.0E-05 • Collective dose to the affected off-site pubic population would be 1.2E-01 person-rem, resulting in 6.0E-05 LCFs	• PCF from radiological releases to involved worker estimated to be 9.0E-05; non-involved workers estimated to be 7.0E-05; off-site MEI estimated to be 5.0E-05 • Collective dose to the affected off-site pubic population would be 6.8E-01 person-rem, resulting in 3.0E-04 LCFs	• PCF from radiological releases to involved worker estimated to be 6.0E-06; non-involved workers estimated to be 5.0E-06; and off-site MEI estimated at 3.0E-06 • Collective dose to the affected off-site pubic population would be 2.8E-02 person-rem, resulting in 1.0E-06 LCFs	• LCF for involved worker population estimated to be 2E-02 • PCF for the non-involved worker and off-site MEI would be equal to that estimated for the treatment technology selected • Collective dose and number of fatalities for the affected off-site population would be equal to that for the treatment technology selected

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Noise (Chapter 4, Section 4.12)	• Noise levels should decrease to 50 to 60 dBA when the High Flux Isotope Reactor access road construction is complete	• Site construction and D&D noise up to 70 dBA • Noise levels during operations at 50 to 60 dBA • Noise increases are temporary and minor	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative	• Same as Low-Temperature Drying Alternative during treatment and would decrease, similar to the levels of No Action, during long-term storage

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Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Accidents (Chapter 4, Section 4.11)	• **Melton Valley Storage Tank (MVST) Breach** – MEI – 1.1E-05 PCF – Population – 1.1 LCF – Non-involved workers – 9.2E-04 PCF • **Vehicle impact (CH TRU and RH TRU waste)** – MEI – 1.6E-06 PCF – Population – 0.024 LCF – Non-involved workers – 1.3E-04 PCF • **Earthquake** – MEI – 1.6E-05 PCF – Population – 0.24 LCF – Non-involved workers – 1.4E-03 PCF • **Vehicle impact/fire (CH TRU and RH TRU waste)** – MEI – 1.4E-07 PCF – Population – 2.1E-03 LCF – Non-involved workers – 1.2E-05 PCF	• **MVST Breach** - NA • **MVST transfer line failure** – MEI – 3.2E-06 PCF – Population – 0.16 LCF – Non-involved workers – 2.8E-04 PCF • **Vehicle impact** - negligible • **Earthquake** – MEI – 4.8E-07 PCF – Population – 7.2E-03 LCF – Non-involved workers – 4.2E-05 PCF • **Vehicle impact/fire** - negligible	• Same as Low-Temperature Drying Alternative	• **MVST Breach** - NA • **MVST transfer line** failure – MEI – 6.3E-06 PCF – Population – 0.31 LCF – Non-involved workers – 5.5E-04 PCF • **Vehicle impact** - negligible • **Earthquake** – MEI – 9.6E-07 PCF – Population – 0.014 LCF – Non-involved workers – 8.4E-05 PCF	• **MVST transfer line failure** – MEI – 3.2E-06 to 6.6E-06 PCF – Population – 0.16 to 0.31 LCF – Non-involved workers – 2.8E-04 to 5.5E-04 PCF • **Vehicle impact** - negligible • **Earthquake (CH TRU and RH TRU waste)** – MEI – 4.8E-07 to 9.6E-07 PCF – Population – 7.2E-03 to 1.4E-02 LCF – Non-involved workers – 4.2E-05 to 8.4E-05 PCF • **Vehicle impact/fire (after processing)** – MEI – 1.4E-07 PCF – Population – 2.1E-03 LCF – Non-involved workers – 1.2E-05 PCF

Table S-3. Comparison of impacts among alternatives (continued)

	No Action Alternative	Low-Temperature Drying Alternative (Preferred)	Vitrification Alternative	Cementation Alternative	Treatment and Waste Storage at ORNL Alternative
Socioeconomic (Chapter 4, Section 4.13)	• No change in economic activity	• No significant impacts • Earnings represent 0.1% of the income for the region	• No significant impacts • Earnings represent 0.2% of the income for the region	• No significant impacts • Earnings represent 0.1% of the income for the region	• No significant impacts • Earnings represent 0.1% of the income for the region
Environmental Justice (Chapter 4, Section 4.14)	• No environmental justice impacts expected	• Same as No Action Alternative	• Same as No Action Alternative	• Same as No Action Alternative	• Same as No Action Alternative

CH TRU = contact-handled transuranic waste.
D&D = decontamination and decommissioning.
HFIR = High Flux Isotope Reactor.
LCF = latent cancer fatality.
MEI = maximally exposed individual.
NA = Not applicable.
ORNL = Oak Ridge National Laboratory.
PCF = probability of cancer fatality.
RH TRU = remote-handled transuranic waste.
TRU = transuranic.

S1.8 CUMULATIVE IMPACTS

The evaluation of cumulative impacts couples impacts of the proposed action and, where appropriate, the bounding alternative for each resource area, with impacts from other past, present, and reasonably foreseeable future actions.

The proposed action would be consistent with the existing industrial land use classification in Melton Valley. The cumulative impact on land use would be small because only 3.4 ha (9 acres) would be developed for the treatment and storage facilities (based on the Treatment and Waste Storage at ORNL Alternative, using vitrification as the treatment technology for the bounding case). Construction and operation of a vitrification treatment facility would only result in 2.8 ha (7 acres) of forested land disturbed for a period of at least a decade, thereby resulting in a small incremental increase in the loss of habitat in the lower reaches of Melton Valley.

Cumulatively, impacts to water resources in the White Oak Creek watershed are expected to be mostly beneficial. The proposed action would augment several ongoing CERCLA actions in the watershed designed to reduce strontium-90 and other contamination in groundwater and in the soil. By implementing the proposed action, waste in the SWSA 5 North trenches would be treated. Sedimentation that could occur from the proposed action would be small and would help renew ongoing sediment depletions in the White Oak Embayment; sedimentation is beneficial because it provides shielding. However, a 0.016-ha (0.03-acre) wetland on the proposed project site is expected to be eliminated by construction.

There are 65 ha (160 acres) of land in Melton Valley devoted to waste storage and operation (DOE 1997a). For the Treatment and Waste Storage at ORNL Alternative, additional on-site storage space up to 0.8 ha (2 acres) would be required. Given the extensive area already devoted to waste storage in Melton Valley, this would not be cumulatively significant.

Ongoing and future projects involving ground disturbance activities that would likely result in fugitive dust emissions include the Old Melton Valley Access Road upgrade and the proposed Spallation Neutron Source. There should not be a direct cumulative impact to air quality from fugitive dust emissions from the proposed action; however, deposition of particulates from the proposed action combined with emissions from the Old Melton Valley Road upgrade and other large construction projects, such as the Spallation Neutron Source, could indirectly affect vegetation by coating leaves with dust.

The Toxic Substances Control Act (TSCA) Incinerator at the ETTP, the Bull Run Steam Plant 8 km (5 miles) east of ORNL, and the Kingston Steam Plant [approximately 48 km (30 miles) northwest of ORNL] near Kingston, Tennessee, are major atmospheric emission sources in the region which affect the air quality at ORNL. The TSCA Incinerator is a source of radionuclide emissions at the ETTP. All action alternatives considered for the proposed action would contribute a small amount to the overall emissions in the air shed.

The transportation of TRU Waste Treatment Project waste would be a subset of the total volume of waste evaluated in the WM PEIS. At ORR, the DOE WM PEIS estimated that transport of all waste types would result in 8.1E-04 accidents per shipment and 1.1E-04 fatalities per shipment (DOE 1997c). For the proposed action, the greatest number of waste shipments would occur under the Cementation Alternative (2,425 shipments of TRU and 914 shipments of low-level waste), which represents the bounding alternative. Under the Cementation Alternative, the TRU waste shipments are estimated to result in 2.2 accidents and 3.0E-01 fatalities.

Regarding human health risk, all action alternatives would eventually result in reducing long-term exposure to chemical and radiological contaminants; however, during the treatment and repackaging effort, some process releases and resulting risks to humans would occur. The bounding alternative for this resource area, the Vitrification Alternative, would contribute 6.8E-01 person-rem to the affected population and a corresponding 3E-04 latent cancer fatality risk to that population. Cumulatively, this risk, combined with existing risks and risks form the Spallation Neutron Source Project, would result in 3.1E-01 latent cancer fatalities.

The proposed TRU Waste Treatment Project would contribute very little additional employment, and the project's contribution to cumulative socioeconomics impacts would be very small.

S1.9 MITIGATION

Several best management practices are identified as mitigation measures. These practices include erosion and dust control measures, covering open truck beds during hauling, minimizing time that vehicles idle, and periodic vehicle inspections.

A 0.016-ha (0.03-acre) wetland on the proposed project site is expected to be eliminated by construction. Potential mitigation measures include avoidance, minimization, or compensation. Redesigning the layout of the TRU waste treatment facility could potentially avoid or minimize impact to this wetland. Should this not be practical, then compensatory mitigation, such as new wetland construction, would be done. For example, redesign of the sediment/storm water detention basin could result in a constructed wetland. Mitigation measures to achieve no net loss of wetlands will be provided in a Mitigation Action Plan.

S1.10 UNAVOIDABLE ADVERSE IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Despite mitigation measures, there would be some small, but unavoidable adverse impacts resulting from the implementation of the proposed action. Depending on the treatment process, 2 to 2.8 ha (5 to 7 acres) of forested land would be used for construction of the proposed waste treatment facility, resulting in the loss of this habitat by plants and animals for a period of at least a decade (Sections 4.1 and 4.3). The area would be revegetated after closure and D&D of the facility.

Approximately 0.8 ha (2 acres) of land would be required indefinitely (which some may consider to be irreversibly and irretrievably committed) for the waste storage facilities if the Treatment and Waste Storage at ORNL Alternative is implemented. Land indefinitely committed as storage space would be approximately 0.2 ha (0.75 acres) for the low-temperature drying treatment, 0.6 ha (1.5 acres) for the vitrification treatment, or 0.8 ha (2.0 acres) for the cementation treatment (Section 4.1). This would constitute an irreversible and irretrievable commitment of land. There would, however, be no loss of federally protected threatened or endangered species or critical habitat (Section 4.5.3). The proposed action would also involve the irreversible or irretrievable commitment of energy and materials. Approximately 11,250 to 45,000 MW of electrical energy would be committed and consumed depending on the alternative selected (Section 4.9).

S1.11 APPLICABLE LAWS AND REGULATIONS

A number of laws, regulations, and agreements would apply to the Proposed Action. These are discussed in detail in Chapter 8, and some highly relevant ones are summarized here.

The Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. §6901 et seq.), regulates the treatment, storage, and disposal of hazardous wastes. Regulation is by permit, meaning that the State of Tennessee and EPA study the alternative chosen by DOE and then establish a permit specific to the project that describes how the project is to be carried out. Whether DOE chooses the No Action Alternative, or any other alternative under consideration in this EIS, some type of RCRA permit will be required.

Selection of any of the action alternatives would require a RCRA permit to treat and store the waste. The land disposal restrictions would be addressed though the TDEC Commissioner's Order (dated September 1995).

Under the TDEC Commissioner's Order, DOE is required to implement the Site Treatment Plan (under the Federal Facility Compliance Act) that mandates specific requirements for the treatment and shipment of ORNL's mixed TRU waste. The primary milestone in the Commissioner's Order is that DOE begin treating legacy TRU sludge in order to make the first shipment to the WIPP (a DOE transuranic waste disposal facility) in New Mexico by January 2003.

If the No Action Alternative were selected, DOE is potentially subject to fines and penalties due to non-compliance with the Tennessee Commissioner's Order, which requires treatment and shipment offsite of the TRU waste.

Should the Treatment and Waste Storage at ORNL Alternative be undertaken, modification of the Commissioner's Order would be required, as the Order requires wastes to be treated and shipped. In addition, new storage units could be required in order to accommodate increasing volumes of stored wastes.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended (42 U.S.C. §9601 et seq.), is the authority under which the TRU wastes currently stored in the SWSA 5 North trenches would be removed. After removal of the waste from the SWSA 5 North trenches, residual contamination in the surrounding media (soils and groundwater) may still need to be addressed under a subsequent CERCLA action. In addition, from a cumulative impacts perspective, the proposed action would assist the CERCLA cleanup at Melton Valley.

S1.12 REFERENCES

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DOE 1997d. *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS), DOE/EIS-0200-F, U.S. Department of Energy, Washington, D.C., May 1997.

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DOE 1998b. *WIPP SEIS-II, Record of Decision for the Department of Energy's Waste Isolation Pilot Plant Disposal Phase, Federal Register,* Vol. 63, No. 15, January 23, 1998, pages 3624–3629.

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